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Minimizing Effects of CO_2 Storage in Oceans

THE POTENTIAL NEGATIVE BIOLOGICAL AND environmental impacts of sequestering carbon dioxide (CO_2) in the ocean by means of ocean fertilization (*1*) or direct CO_2 injection (*2*) are discussed in a Policy Forum and Perspective, respectively, in *Science*'s 12 October issue. However, the oceans already serve as a repository of anthropogenic CO_2, ingassing and storing ~2 picograms of carbon per year, an amount that could potentially have significant consequences for marine biota (*3*). The issue, therefore, is to reduce CO_2 emissions or their impacts in ways that provide a net environmental benefit. It remains to be shown if the negative consequences of the purposeful ocean CO_2 sequestration strategies are real and worse than other alternatives. Should the environmental and climatic effects of unmitigated CO_2 release to the atmosphere make CO_2 sequestration a necessity, the potential of the oceans for such a repository should not be ignored.

One way to avoid some of the negative chemical and biological effects of ocean CO_2 storage would be first to react waste CO_2 with water and a carbonate mineral (e.g., limestone) to form dissolved bicarbonate (*4*) for release into the sea. This would simply speed up part of Earth's natural carbon cycle (carbonate weathering), which is already central in modulating atmospheric CO_2, but over geologic time scales (*5*). The addition of alkalinity to the ocean resulting from this enhanced bicarbonate production would also help to buffer ocean acidification attributable to anthropogenic CO_2 from the atmosphere (*3*). In any case, there are other ways to diminish the impact of our energy economy on the environment (*6*), and it would be shortsighted not to evaluate our options carefully.

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References and Notes

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